

Rhode Island Department of Transportation

Roundabouts

Benefits of Roundabouts

- Safest At-Grade Intersection Possible
- High Capacity/Low Delay
- Good for All Modes of Traffic
- Reduce Vehicle Emissions
- Geometric Flexibility
- Aesthetics

Roundabout vs. Traffic Circles

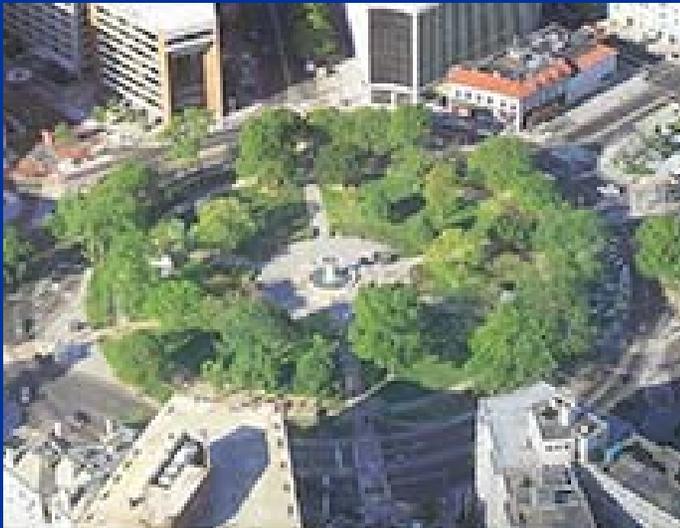
	Modern Roundabouts	Traffic Circles (Rotaries)
Size	150' to 230' 2-lane roundabout	600' or more
Circulatory speed	15 to 25 mph	30 to 35 mph
Deflection at entry	Sharper curve at entry	Smoother curve or no deflection

Roundabout vs. Traffic Circles

	Modern Roundabouts	Traffic Circles (Rotaries)
Traffic Control	Yield Control	Stop Control
Right of Way	Vehicles in the Roundabout	Vehicles Entering the Circle
Pedestrian Access	Never in the Center Island	Allow Pedestrians in the Center Island
Direction of Circulation	Counterclockwise around the Center Island	Counterclockwise or Clockwise

Roundabout vs. Traffic Circles

Old Traffic Circle



Modern Roundabout



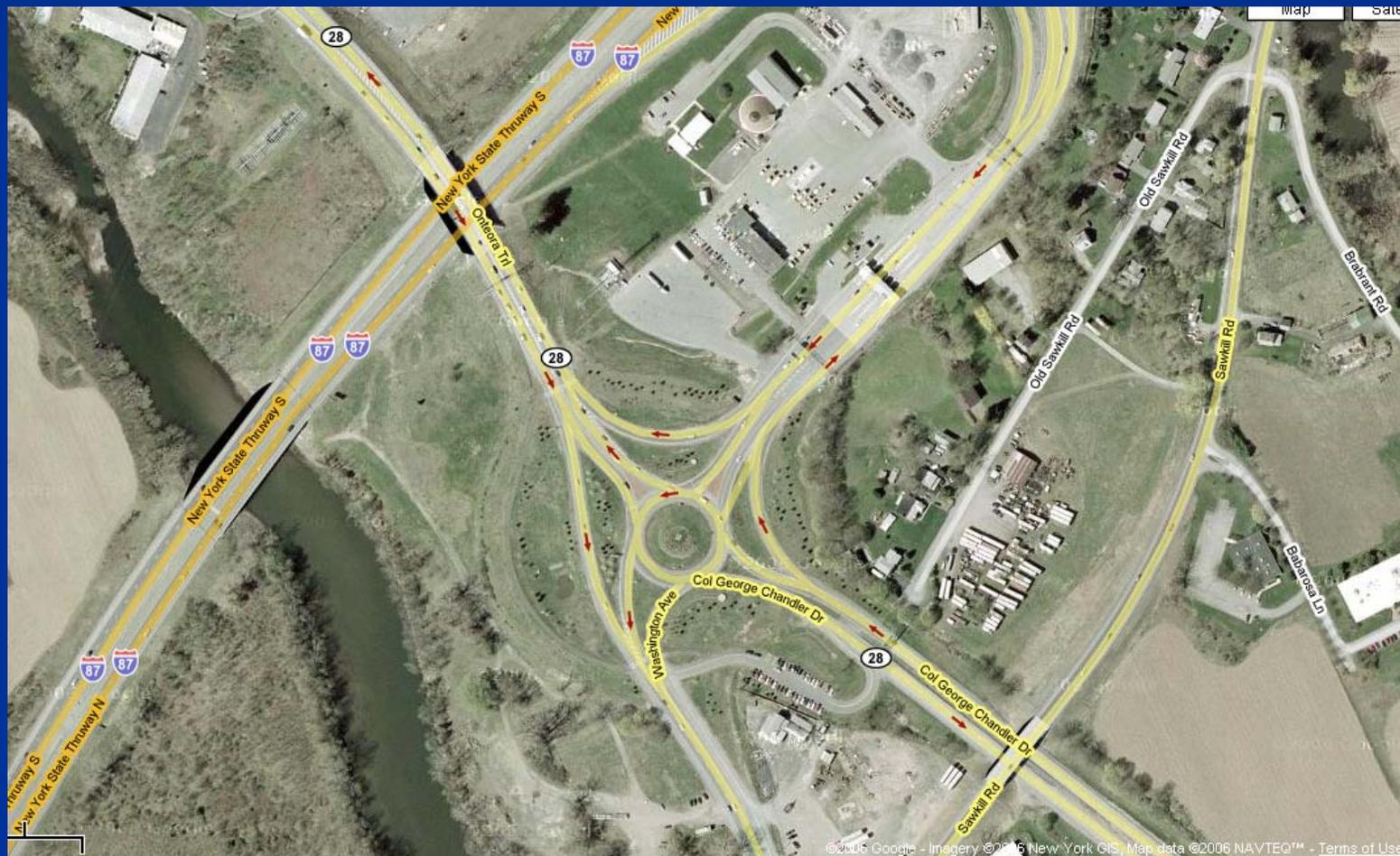
Roundabout vs. Traffic Circles

Kingston, NY



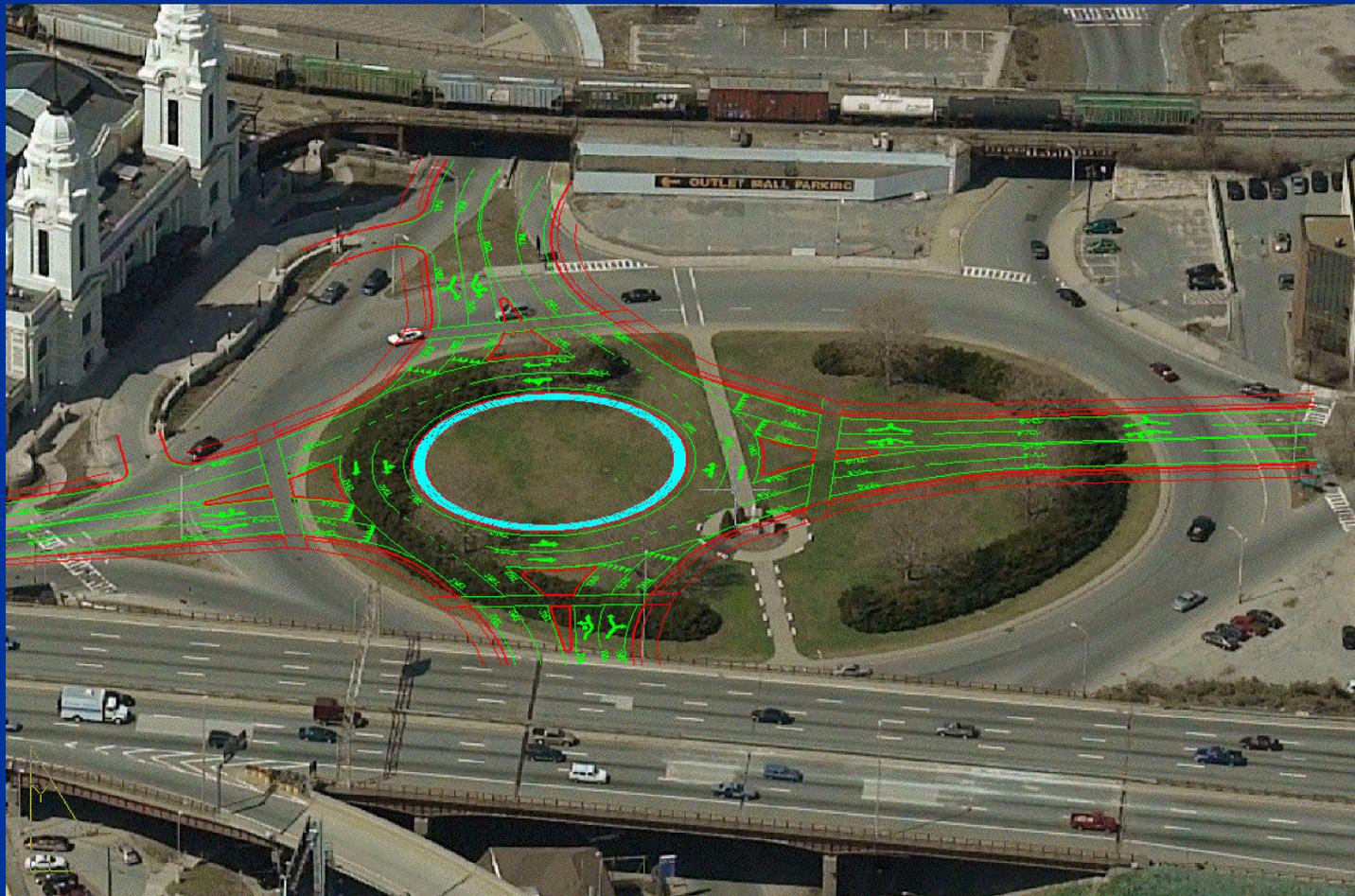
Roundabout vs. Traffic Circles

Kingston, NY



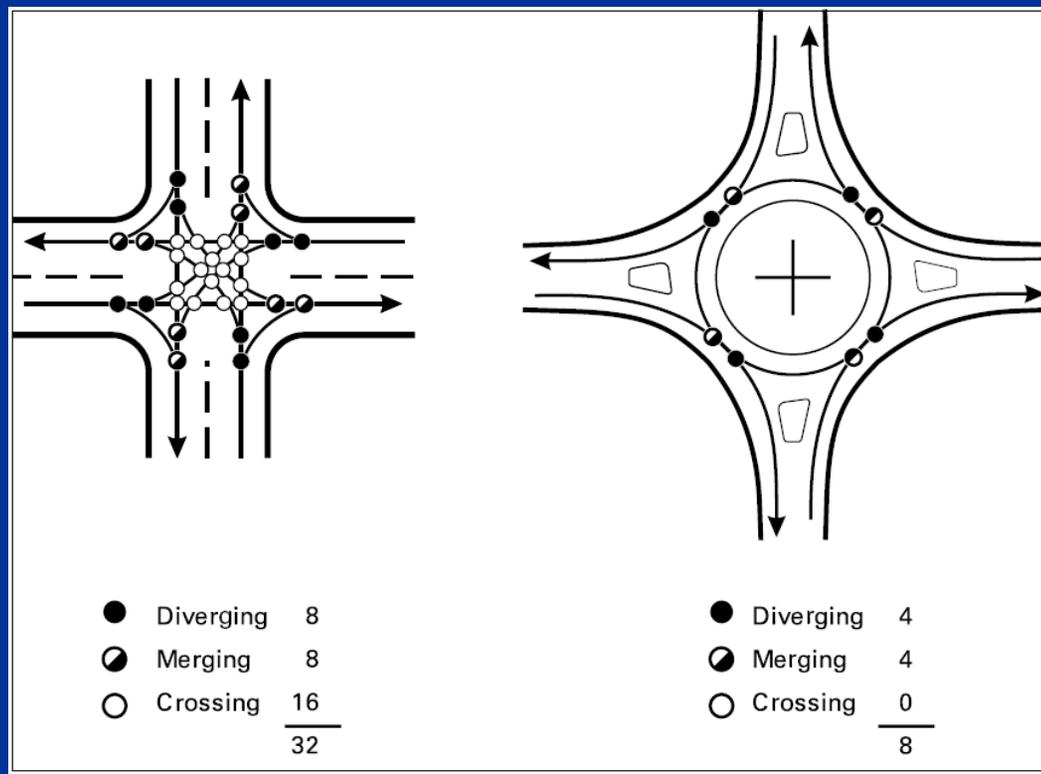
Roundabout vs. Traffic Circles

Washington Square
Worcester, MA



Roundabout vs. Signalized Intersections

Reduce points of conflict from 32 to 8 compared with a traditional intersection



Roundabout vs. Signalized Intersections

Before
Signalized Intersection



After
Roundabout



Asheville, North Carolina

Reduce number and severity of accidents

2001 study by the Insurance Institute for Highway Safety showed that:

- 24 intersections in the US converted from signal or stop control to roundabout
- Reduced number of crashes by 39 %
- Reduced number of injury crashes by 76 %
- Reduced fatal or incapacitating crashes by 90 %

Reduce number and severity of accidents

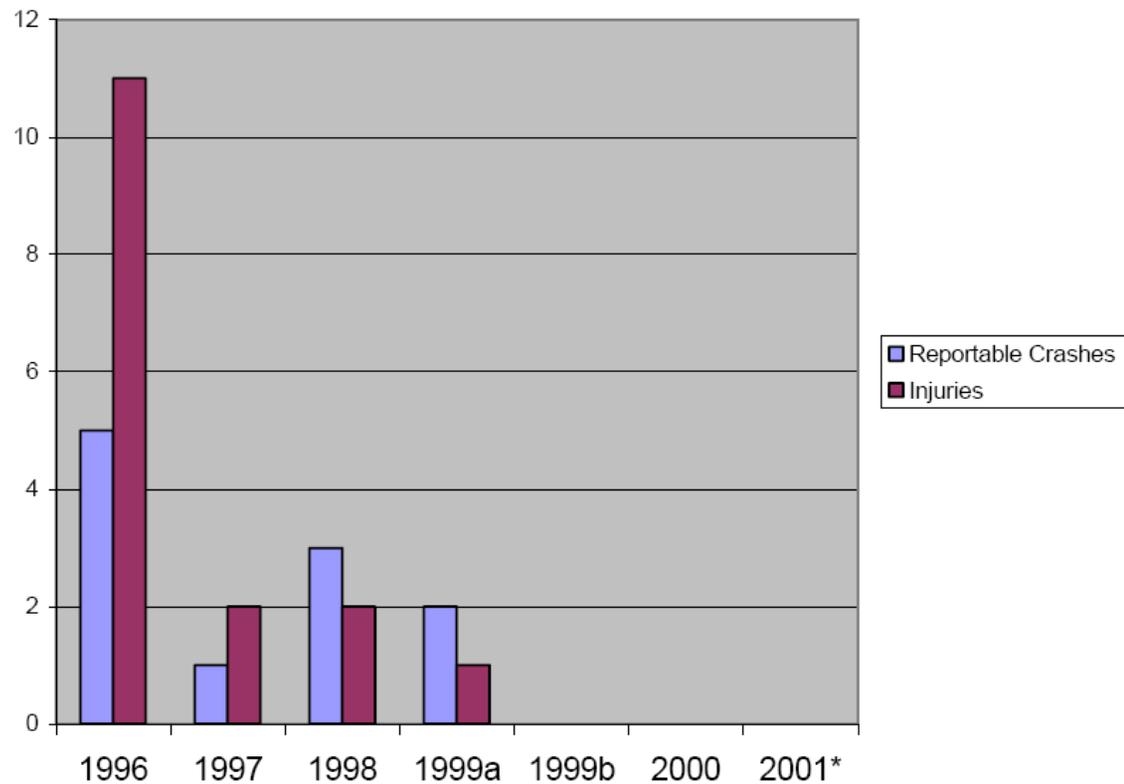
2002 study in Maryland:

- 15 intersections converted from signal or stop control to single lane roundabout
- Reduced number of crashes by 60 %
- Reduced number of injury crashes by 82 %
- Reduced fatal or incapacitating crashes by 100 %
- Reduced property damage only (PDO) by 27 %

Reduce number and severity of accidents

Lineville Road &
Cardinal Lane,
Howard WI

Figure 2: Reportable Crashes and Injuries at the Lineville Road/Cardinal Lane Intersection (1996 - 2001)



Reduce Vehicle Delays

2004 study in Kansas showed that:

- 11 state intersections converted from signal or stop control to roundabout
- Reduced average vehicle delay by 65 %
- Reduced average of vehicle stops by 52 %

Reduce Vehicle Delays

Stop Controlled
Intersection

Roundabout

Accommodate larger vehicles

- Geometry provides a Truck Apron
- Vehicles with large turning radii such as buses, trucks, tractor trailers

Accommodate larger vehicles

Fire trucks on
roundabouts

Reduce Vehicle Emissions and Fuel Consumption

2004 study of roundabouts across the US:

- Reduced Carbon Monoxide Emissions by 32 %
- Reduced Nitrous Oxide Emissions by 34 %
- Reduced Carbon Dioxide Emissions by 37 %
- Reduced Hydrocarbon Emissions by 42 %

Mandavilli, S.; Russell, E.R.; and Rys, M. 2004. Modern roundabouts in United States: an efficient intersection alternative for reducing vehicular emissions. Poster presentation at the 83rd Annual Meeting of the Transportation Research Board, Washington DC.

Reduce Vehicle Emissions and Fuel Consumption

- Study of 10 intersections in Virginia showed that consumption was reduced on more than 200,000 gallons of fuel per year *
- Study on the US showed that fuel consumption was reduced by about 30 % **

* Bergh, C.; Retting, R.A.; and Myers, E.J. 2005. Continued reliance on traffic signals: the cost of missed opportunities to improve traffic flow and safety at urban intersections. Arlington, VA: Insurance Institute for Highway Safety.

** Várhelyi, A. 2002. The effects of small roundabouts on emissions and fuel consumption: a case study. Transportation Research Part D: Transport and Environment 7:65-71.

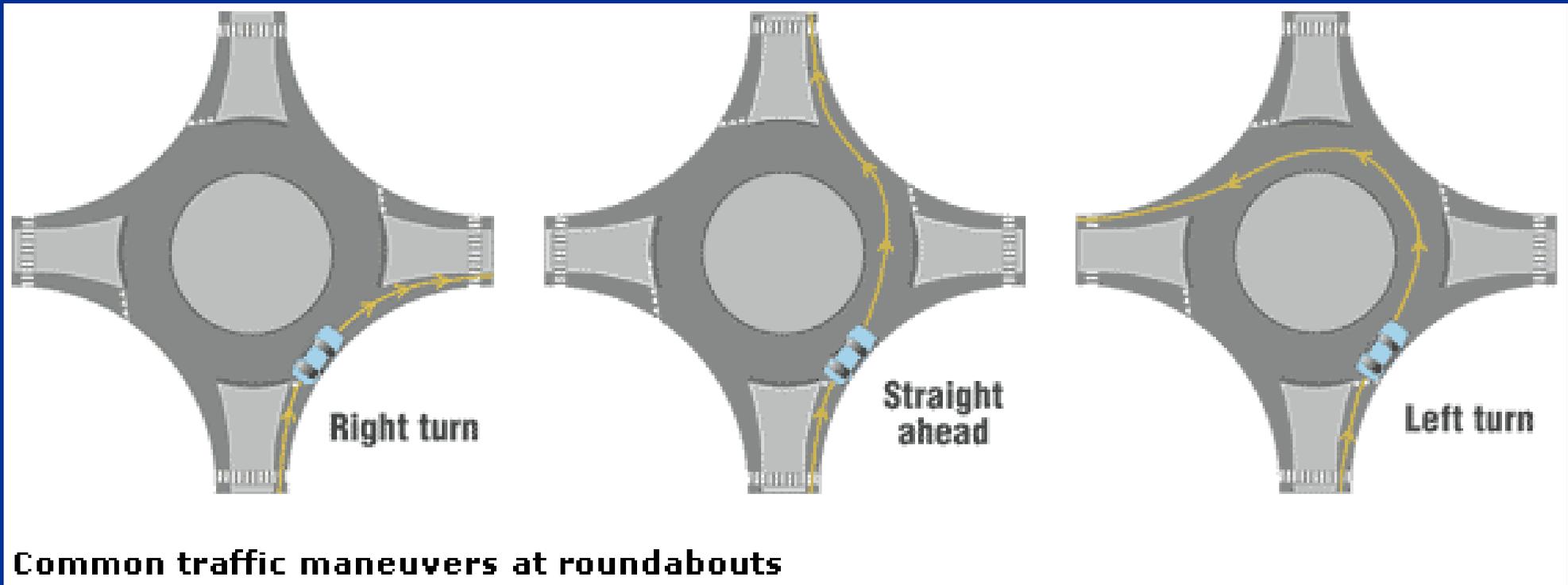
Enhance the aesthetics

- City of Golden CO, South Golden Road Corridor
- Replaced signals with roundabouts

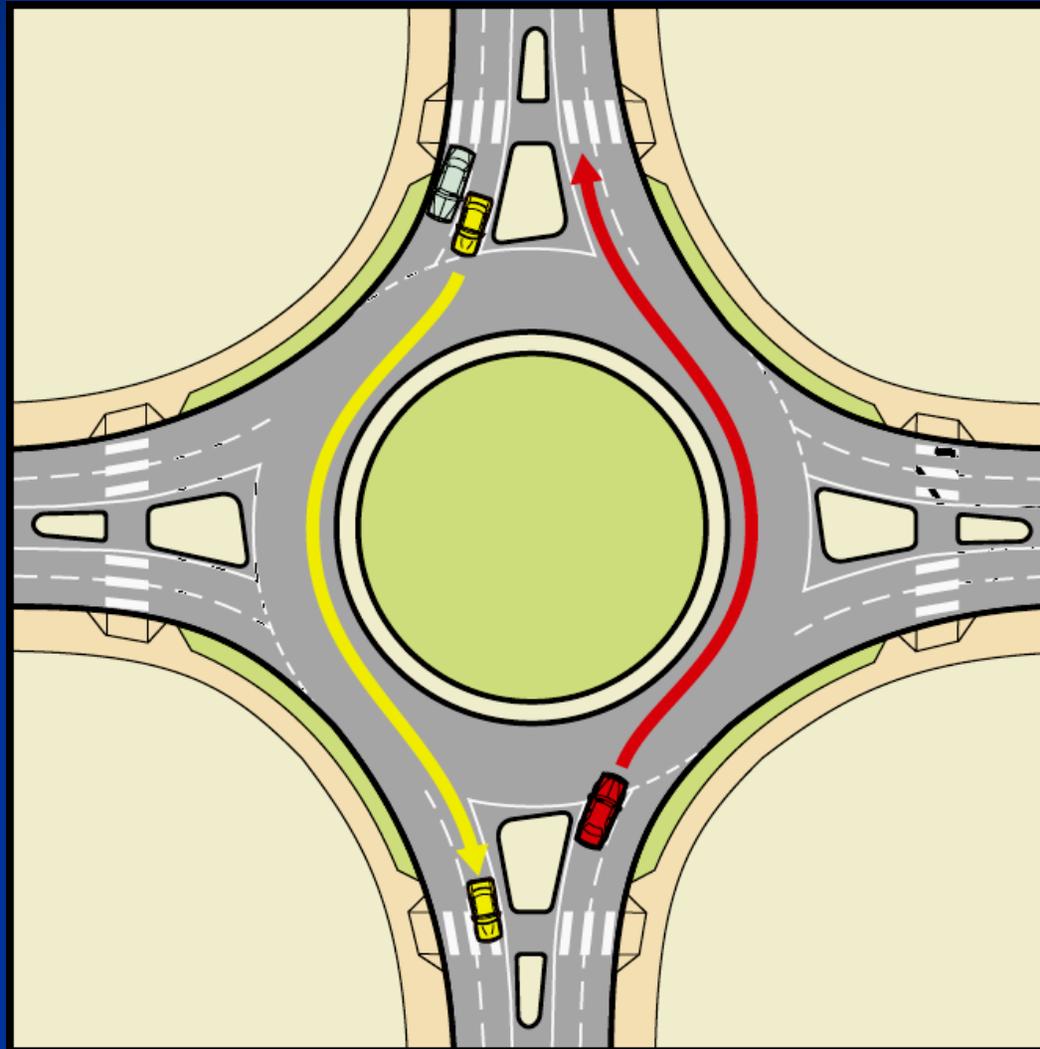


Phil Demosthenes, Colorado DOT

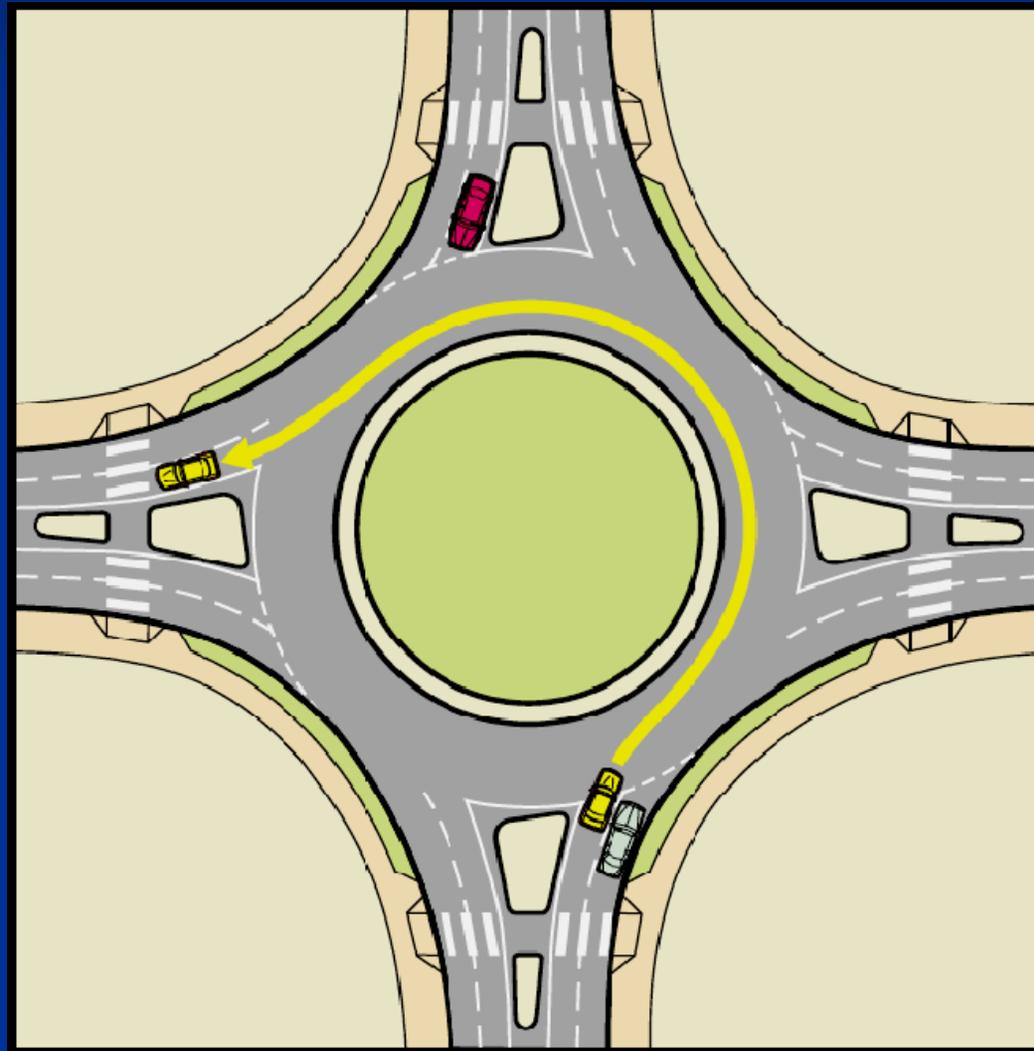
Driving on a Roundabout



Driving on a Roundabout



Driving on a Roundabout



Modern Roundabouts

Fairbanks, Alaska



Modern Roundabouts

Kingston, NY
NY 28 @ I-87



Modern Roundabouts

Avon, CO
Avon Road @ I-70



Modern Roundabouts

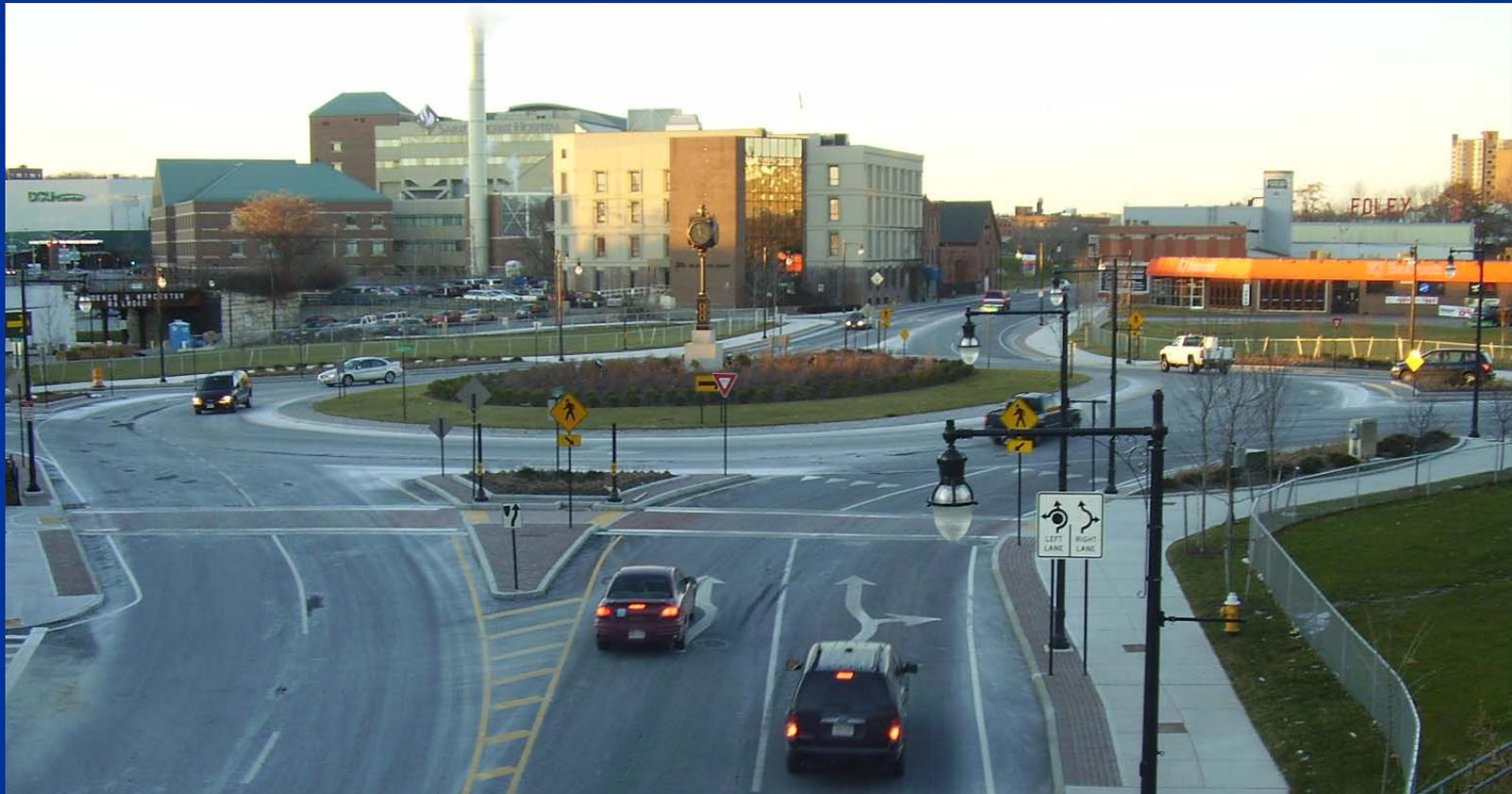
Nashua, NH

Main Street @ Daniel Webster Hwy



Modern Roundabouts

Worcester, MA
Washington Square



Roundabouts in Rhode Island

- Centerdale, North Providence
- Twin River Road, Lincoln
- Royal Mills, West Warwick
- Quonset Industrial Park, North Kingstown
- Fruit Hill, North Providence
- Apponaug Bypass, Warwick *

* In Design Stage.

Roundabouts in Rhode Island



Centerdale, North Providence

Roundabouts in Rhode Island



Centerdale, North Providence

Roundabouts in Rhode Island



Centerdale, North Providence

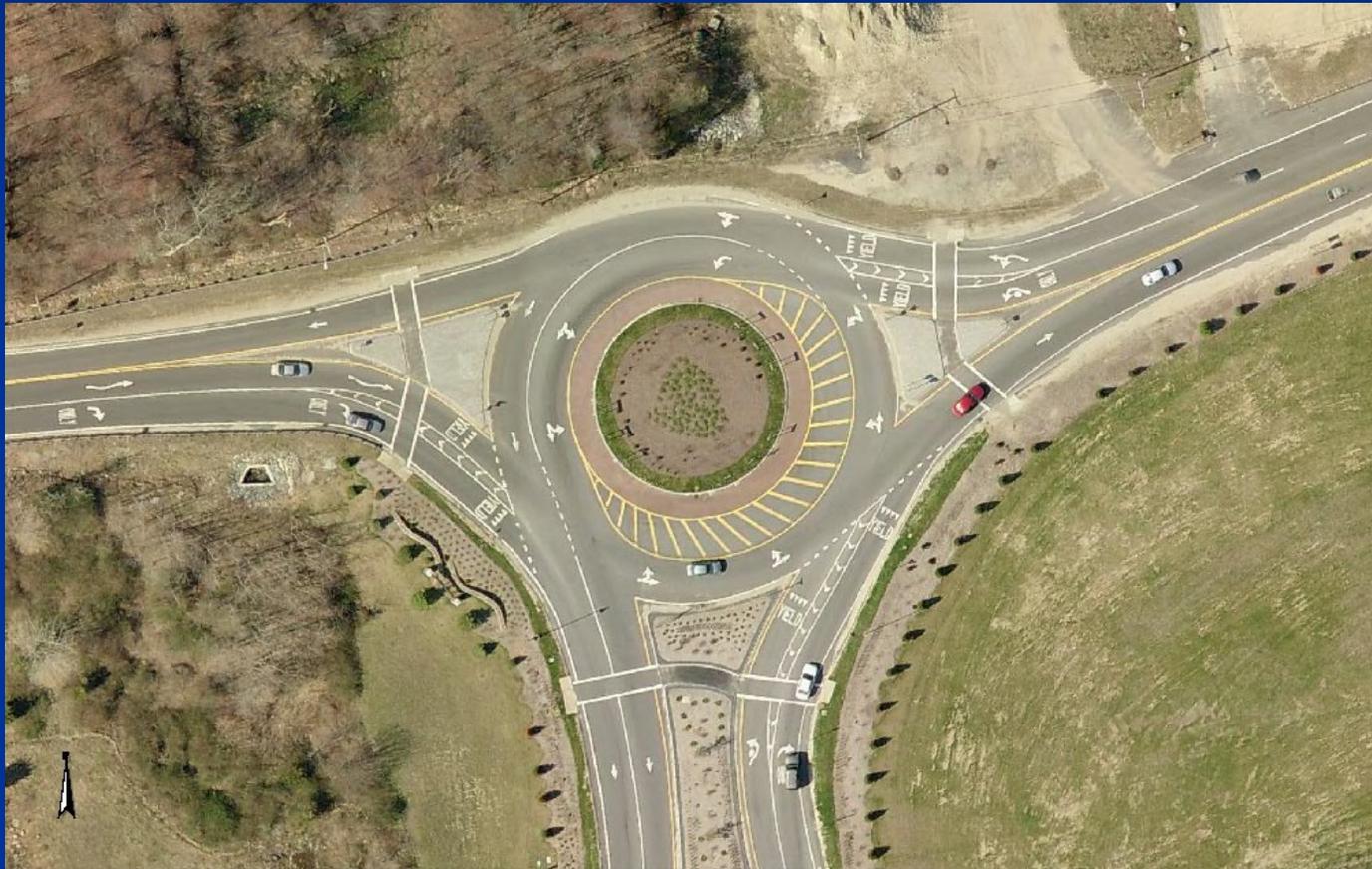
Roundabouts in Rhode Island

Centerdale, North Providence

- 10 crashes in the last three years

	2006	2007	2008
Rear-end	2		1
Side swipe	1	1	1
Lost control		2	2

Roundabouts in Rhode Island



Twin River Road, Lincoln

Roundabouts in Rhode Island

Twin River Road, Lincoln



April, 2004



December, 2006

Roundabouts in Rhode Island



January, 2007



June, 2009

Twin River Road, Lincoln

Roundabouts in Rhode Island



Twin River Road, Lincoln

Roundabouts in Rhode Island



Royal Mills, West Warwick

Roundabouts in Rhode Island



Royal Mills, West Warwick

Roundabouts in Rhode Island



Royal Mills, West Warwick

Roundabouts in Rhode Island



Royal Mills, West Warwick

Roundabouts in Rhode Island



Quonset, North Kingstown

Roundabouts in Rhode Island



Quonset, North Kingstown

Roundabouts in Rhode Island



Quonset, North Kingstown

Roundabouts in Rhode Island



Quonset, North Kingstown

Roundabouts in Rhode Island



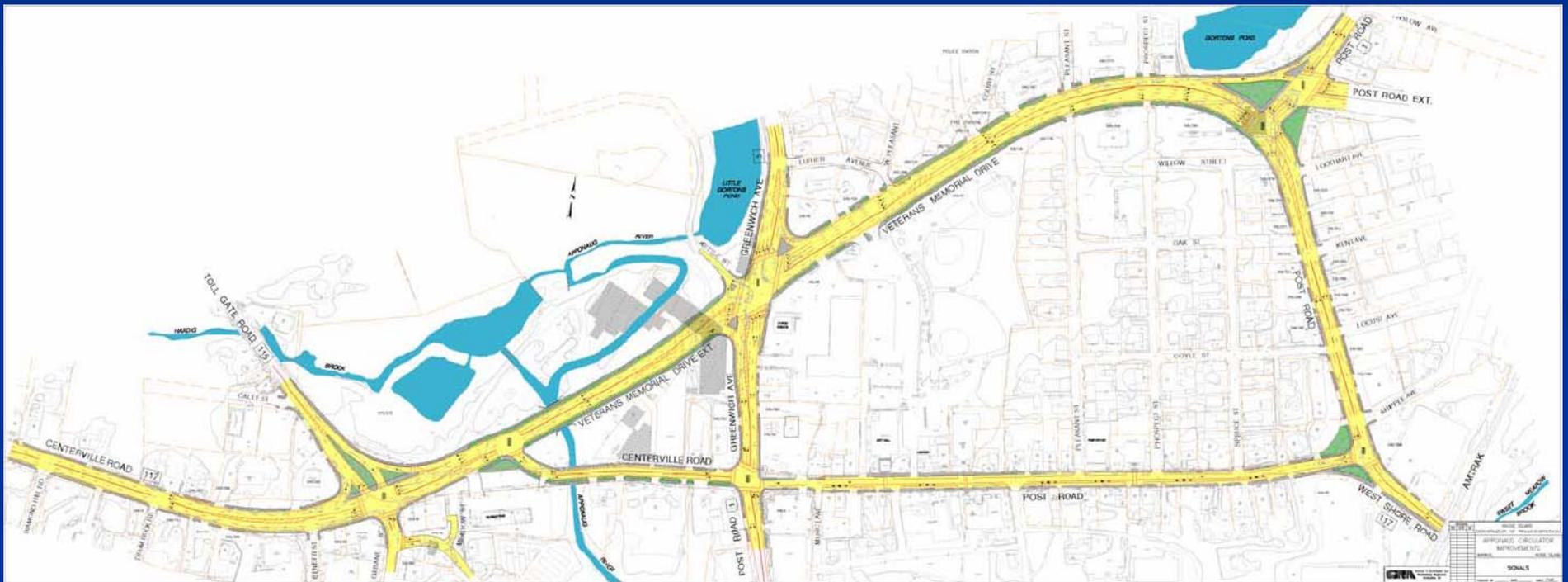
Quonset, North Kingstown

Roundabouts in Rhode Island



Quonset, North Kingstown

Roundabouts in Rhode Island



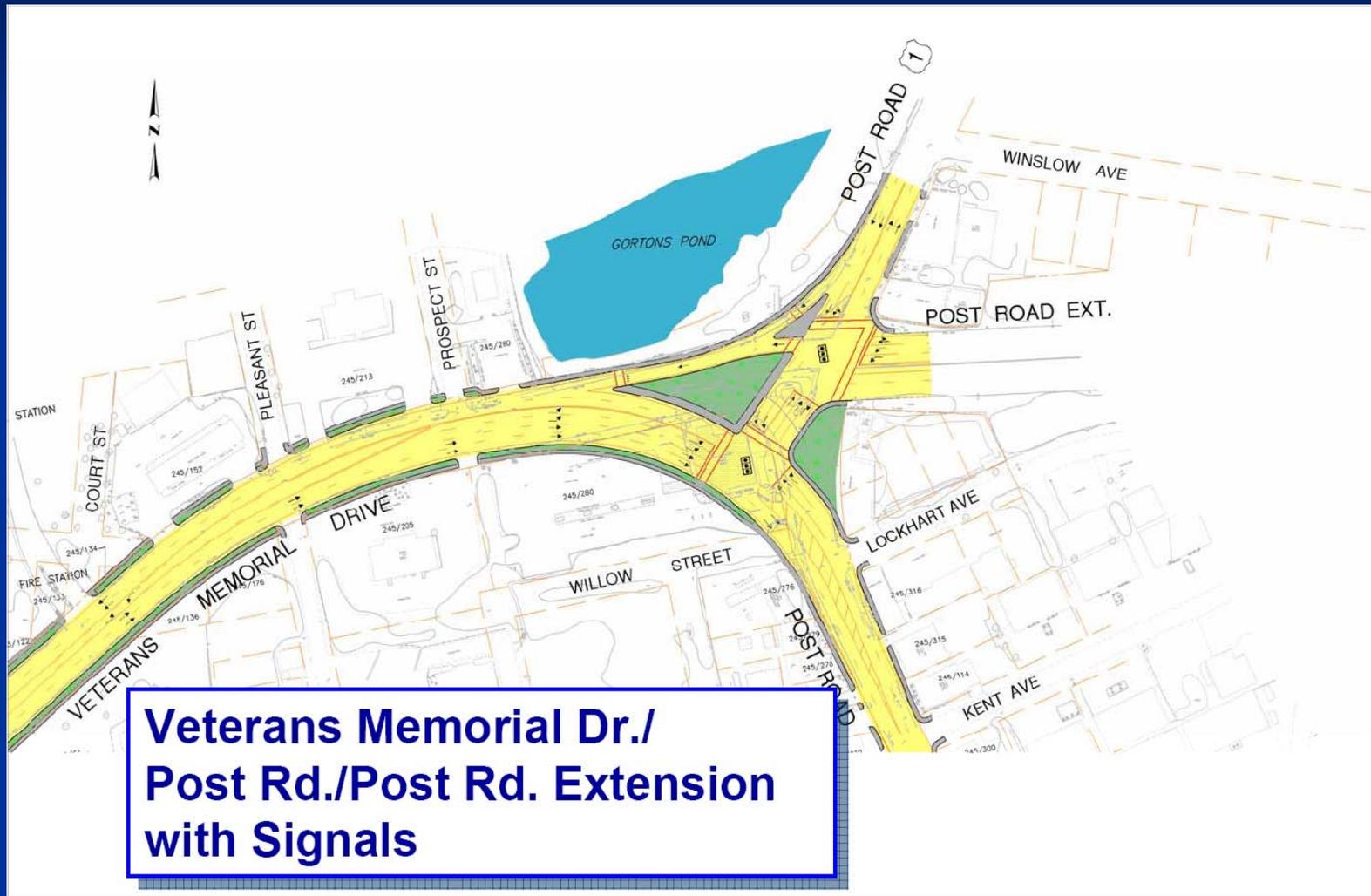
Apponaug, Warwick

Roundabouts in Rhode Island



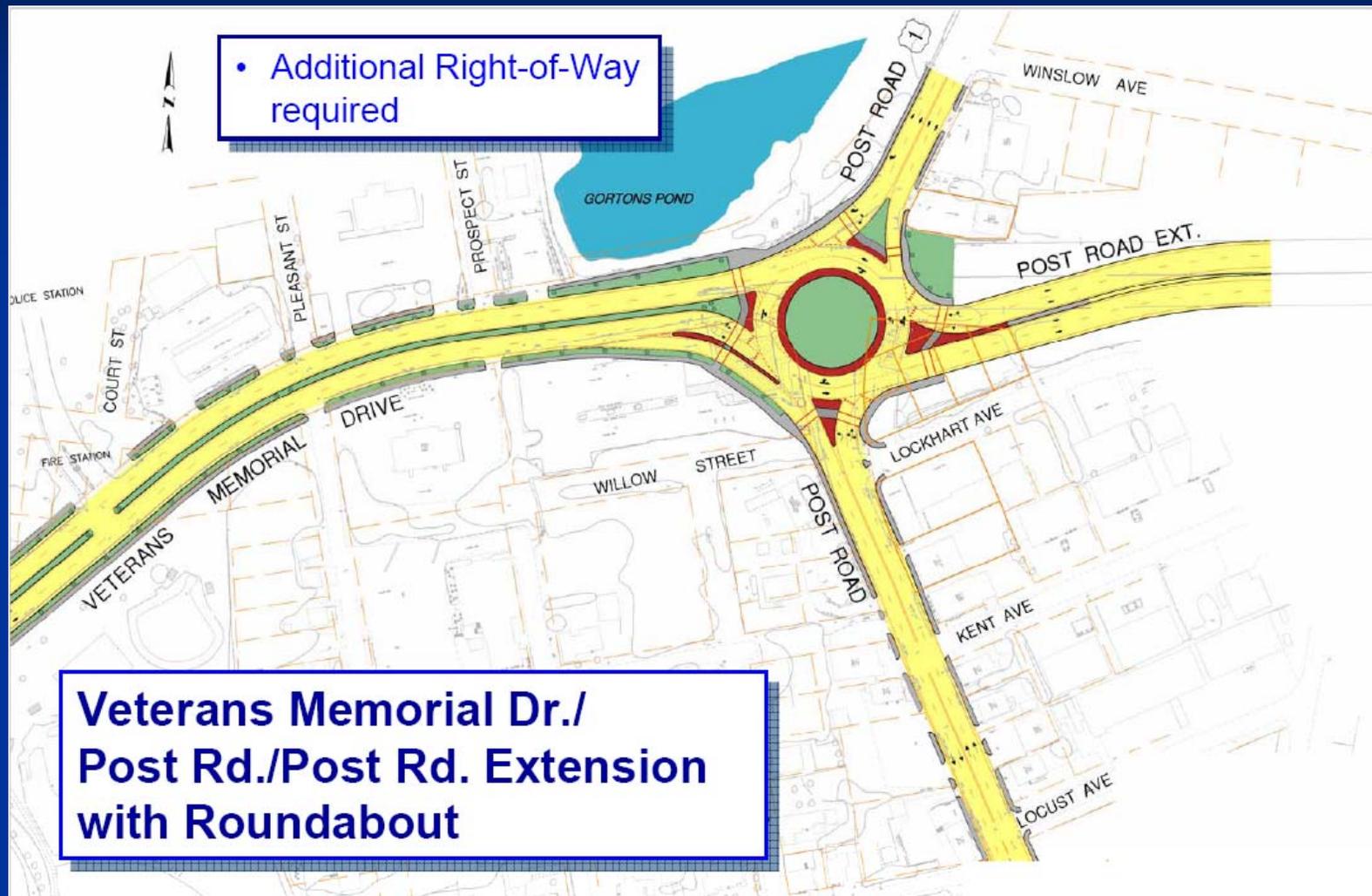
Apponaug, Warwick

Roundabouts in Rhode Island



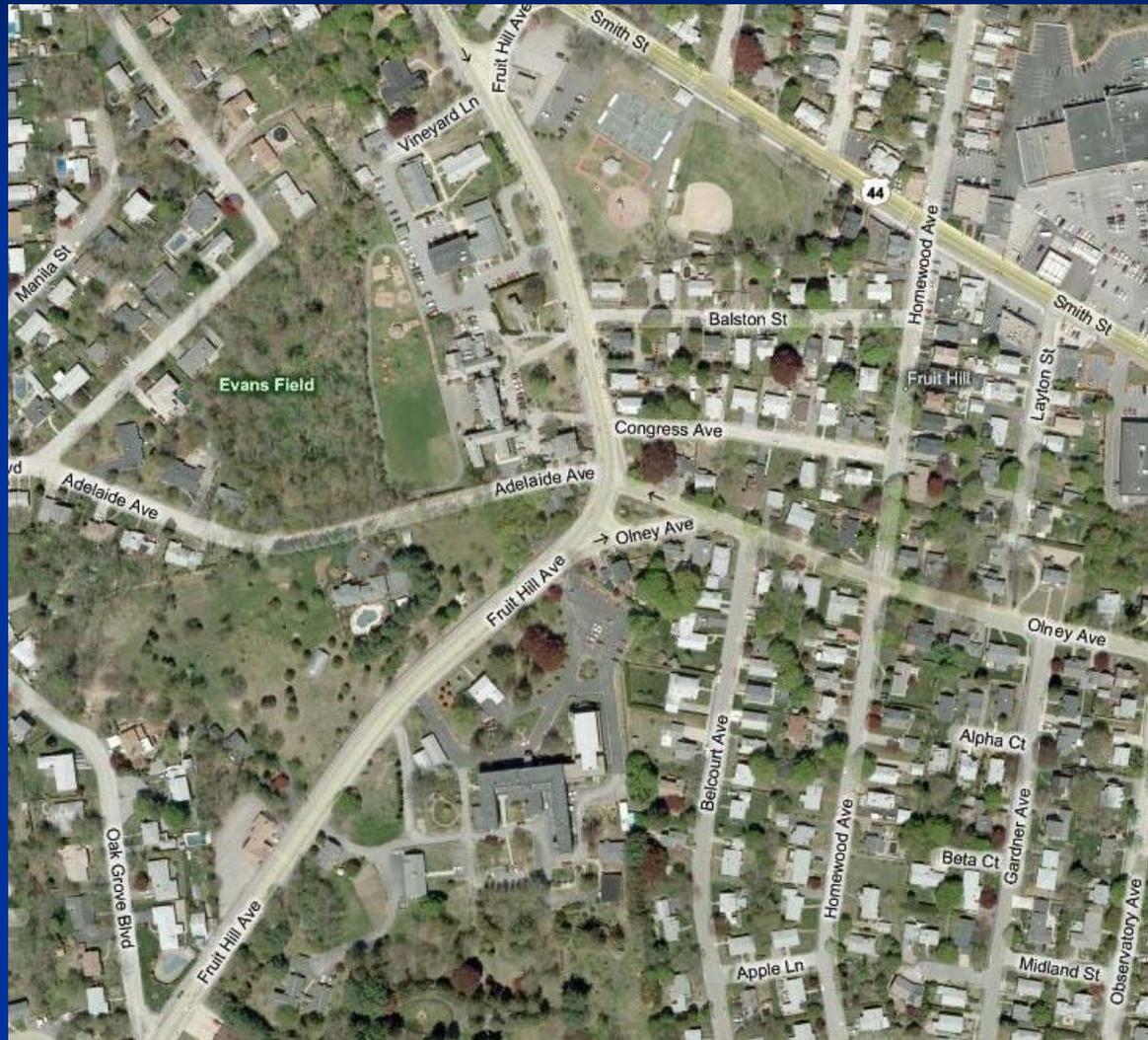
Signalized Alternative

Roundabouts in Rhode Island



Apponaug, Warwick

Roundabouts in Rhode Island



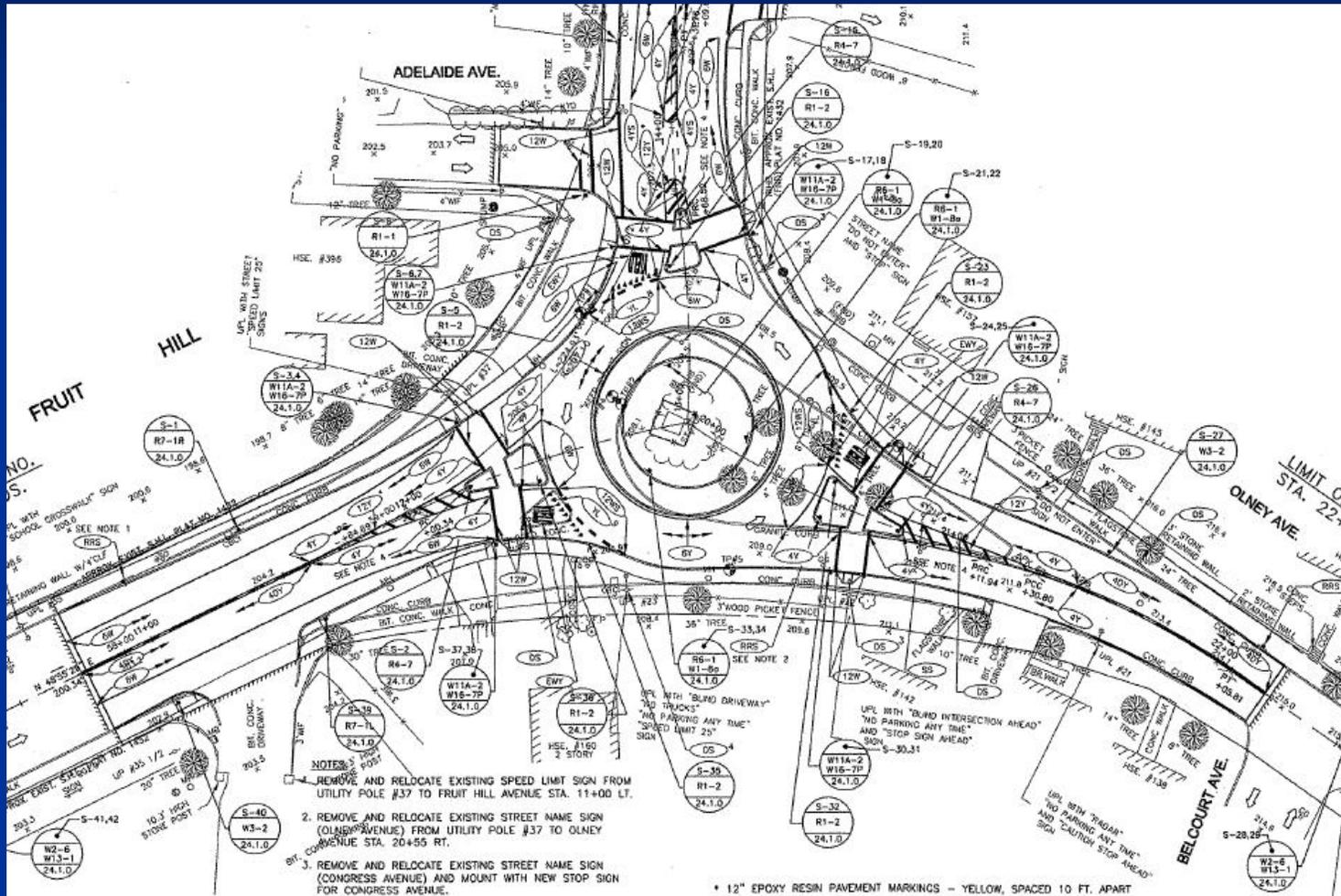
Fruit Hill, North Providence

Roundabouts in Rhode Island



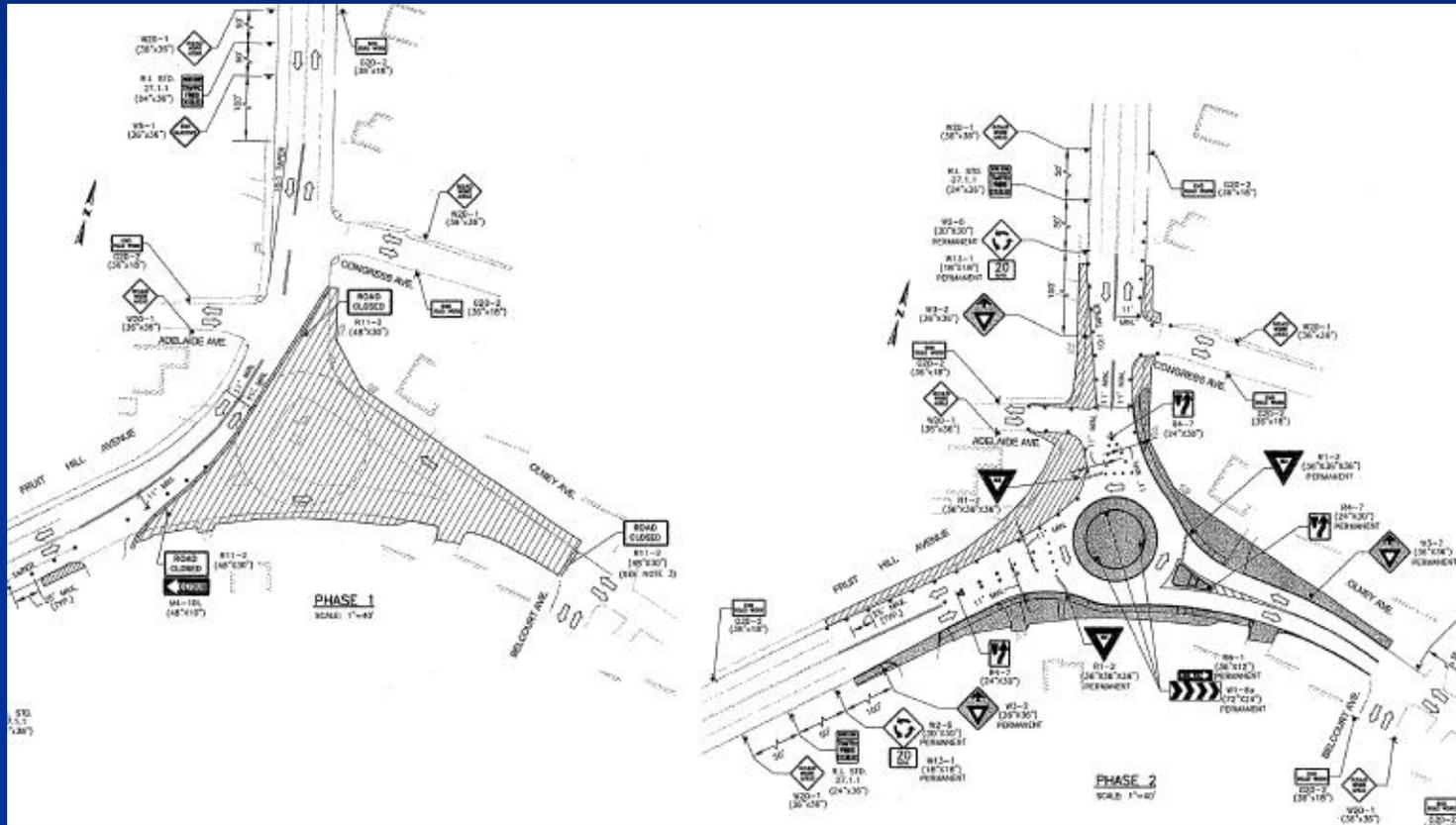
Fruit Hill, North Providence

Roundabouts in Rhode Island



Fruit Hill, North Providence

Roundabouts in Rhode Island



Fruit Hill, North Providence

Roundabouts in Rhode Island

Conclusions:

- Increase Safety
- Reduce Vehicle Speed
- Fit all Kind of Vehicles
- Reduce Congestion and Vehicle Emissions
- Aesthetics

Roundabouts in Rhode Island

Conclusions:

- 5 existing roundabouts
- 1 existing mini-roundabout
- 4 retrofitted rotaries
- 1 under construction
- 32 on different design stages